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ABSTRACT

This issue brief uses narrative, tables, and graphs to summarize data on degrees earned by foreign graduate students in the United States, the percentage of foreign graduate students in the United States, the home countries of foreign doctoral students, their major fields of study, and their plans after graduation. Data were obtained from two surveys the Survey of Earned Doctorates and the Integrated Postsecondary Education Study Data System. Among major findings are: (1) In 1994, foreign graduate students earned 12 percent of all master's degrees and 27 percent of all doctor's degrees (up from 6 and 11 percent in 1977); (2) students from five countries (the People's Republic of China, Korea, Taiwan, India, and Canada) made up 53 percent of all foreign doctoral students; (3) between 1985 and 1995, the proportion of foreign doctoral students with definite commitments to stay in the United States after graduation increased from 46 to 54 percent; and (4) most students with such commitments earned doctoral degrees in science and engineering. (DB)

NATIONAL CENTER FOR EDUCATION STATISTICS

ISSUE BRIEF

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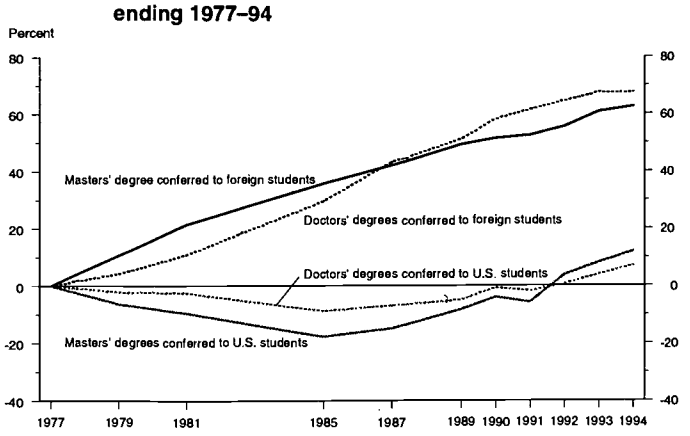
The 20th century has witnessed the expansion of a global marketplace where market productivity has increasingly become dependent on technology. The United States' ability to maintain the technical manpower needed to compete internationally has become a critical issue as has the nation's ability to establish and maintain relationships with other nations. Foreign graduate students were more likely to study science and engineering than U.S. students were and have become the dominant population in some science and engineering fields. During the past 20 years, the number of foreign students receiving advanced degrees from U.S. colleges and universities in science and engineering has increased dramatically. Whether these students remain in the United States to work after graduation or take their skills back to their home countries is critical in assessing U.S. science and engineering resources.

Using data from two surveys, the Survey of Earned Doctorates (SED) and the Integrated Postsecondary Education Study Data System (IPEDS), this issue brief presents data on the percentage of foreign graduate students in the United States, the home countries of foreign doctoral students, their major fields of study, and their plans after graduation.

What percentage of science and engineering graduate degrees (in the United States) do foreign students earn?

In 1994, foreign graduate students earned 12 percent of all master's degrees and 27 percent of all doctor's degrees conferred at U.S. colleges and universities. This percentage was a substantial increase in the percentage of total graduate degrees conferred to foreign students since 1977 when foreign students earned 6 percent of all master's and 11 percent of all doctor's degrees conferred.

Figure 1.—Percentage change since 1977 in number of degrees conferred, by degree level: Selected academic years ending 1977–94



SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*, various years (based on IPEDS/HEGIS surveys of degrees conferred).

Most of the increase in the number of foreign students earning master's degrees occurred in the late 1970s and 1980s. During the 1990s, the increase in the number of foreign students earning graduate degrees in U.S. colleges and universities has slowed in recent years (figure 1). In 1994, 46,317 foreign students earned master's degrees compared to 339,102 U.S. students and 11,538 foreign students earned doctor's degrees compared to 31,611 U.S. students.

Table 1.—Percentage of graduate degrees in science and engineering conferred to foreign students, by degree level and field of study: Academic year ending 1994

Field of study	Master's	Doctor's
Total	**12.0**	**26.7**
Total science and engineering	31.3	40.9
Natural sciences	25.4	33.5
Life sciences	18.0	27.5
Physical sciences	31.1	35.6
Mathematics	26.7	48.5
Computer sciences and engineering	33.5	52.3
Computer and information sciences	37.5	44.8
Engineering	32.1	53.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1996* (based on IPEDS/HEGIS surveys of degrees conferred).

In 1994, 31 percent of all science and engineering master's degrees and 41 percent of all science and engineering doctor's degrees were conferred to foreign students (table 1). Foreign students earned close to 50 percent of the doctor's degrees conferred in mathematics and engineering. Foreign students also earned a substantial number of graduate degrees in business and management. In 1994, 14 percent of master's and 29 percent of doctor's degrees in business and management were conferred to foreign students.

When examining the fields of study that U.S. and foreign graduate students choose, foreign graduate students were more likely to earn degrees in science and engineering than U.S. graduate students. For example, in the 1993–94 academic year, 37 percent of all foreign master's degree recipients earned a degree in science and engineering, compared to 11 percent of U.S. recipients. At the doctoral level, 61 percent of all foreign recipients earned degrees in science and engineering, compared to 32 percent of all U.S. doctoral recipients.[1]

What are the home countries of foreign doctoral students?

In 1995, students from five countries made up the majority (53 percent) of all foreign doctoral students at U.S. colleges and universities: the People's Republic of China (PRC), Korea, Taiwan, India, and Canada. Students from these countries tend to choose different fields of study. In 1995, 51 percent of doctoral students from the PRC studied natural sciences, while 46 and 52 percent of Taiwanese and Indian students studied computer sciences and engineering, respectively. Canadian and Korean students chose more evenly among the different fields of study.

What postdoctoral plans do graduate students have?

Between 1985 and 1995, the proportion of foreign doctoral students with definite commitments (i.e., postdoctoral study or employment) to stay in the United States after graduation increased from 46 to 54 percent (table 2). This increase is made up primarily of the increase in postdoctoral study of foreign doctoral recipients.

Foreign students who earned doctor's degrees in the natural sciences and in computer sciences and engineering were more likely to have definite commitments to stay in the United States after graduation (66 and 62 percent, respectively) than all foreign doctoral students (figure 2). Of those foreign students who earned a doctorate in the natural sciences and had definite plans more than half (54 percent) planned to pursue postdoctoral study in the United States, while 12 percent had employment commitments in the United States. Among foreign students who earned doctorates at U.S. colleges and universities, students from the PRC and India were more likely to stay in the United States after graduation (92 and 89 percent, respectively) than students from Korea (49 percent), Taiwan, and Canada (40 percent each).

Table 2.—Percentage of foreign doctoral recipients with definite plans to remain in the United States after graduation, by field of study and country of origin: 1985 and 1995

		1995				
			Field of study			
Postdoctoral location	1985 Total	Total	Natural sciences	Computer science/ engineering	Country of origin PRC*	India
U.S. location	**46.4**	**53.6**	**65.8**	**62.2**	**92.4**	**88.5**
Postdoctoral study	21.1	27.1	54.1	23.3	59.4	36.6
Employment	25.4	26.6	11.7	39.1	33.0	52.0
Foreign location	**53.5**	**46.4**	**34.1**	**37.6**	**7.6**	**11.5**
Postdoctoral study	6.0	10.0	17.0	6.1	2.5	4.8
Employment	47.6	36.4	17.1	31.6	5.1	6.7

* The People's Republic of China.

NOTE: This table includes foreign doctoral recipients who indicated a "definite" commitment at the time of the survey. A "definite plan" includes signing a contract or other firm commitments for study or employment. About 53 percent of the temporary residents reported "definite plans" in 1995.

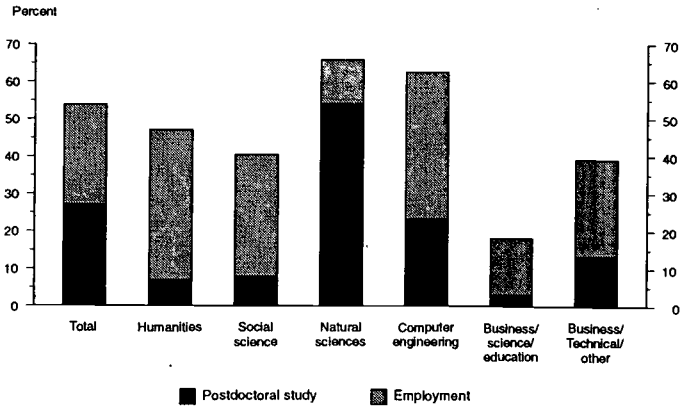
SOURCE: National Research Council, Survey of Earned Doctorates, Doctorate Record File, 1985 and 1995.

Conclusion

There are many factors influencing whether foreign students come to the United States to pursue graduate degrees and choose to stay after graduation, including political, cultural, and social conditions in the student's home country. International competition for top students and smaller allowances from home countries and U.S. institutions may have effected the decline in growth in the number of students coming to the United States in recent years.[2]

Foreign students who earned doctor's degrees in science and engineering were more likely to have definite commitments to stay in the United States after graduation (for postdoctoral study or employment) than foreign students who earned doctorates in other fields. Because graduates use postdoctoral study to further their career in academia and/or to conduct research in the science and engineering fields, those students who stay in the United States may be a major resource for the nation.

Figure 2.—Percentage of foreign doctorate recipients with definite plans to remain in the United States, by field of study: 1995



SOURCE: National Research Council, Survey of Earned Doctorates, Doctorate Records File, 1995.

Foreign graduate students are an important resource at U.S. colleges and universities. They help universities develop an international presence, create a culturally diverse campus environment, bring financial and human resources to the universities and, if they remain in the United States after graduation, are a potential source for additional science and engineering personnel.[2] However, U.S. policymakers must remain aware of the proportion of advanced degrees in science and engineering being awarded to students from other countries. There are a limited number of spaces and money in academic programs and in the research/postdoctoral job market. Are U.S. students simply choosing not to enter these fields of study or is intense competition keeping them from these slots? Further research should be done to investigate whether this is indeed something policy makers need to be concerned about.

Technical notes

In this analysis, foreign students are non-resident aliens with temporary visas and U.S. students are citizens and those non-resident aliens with permanent visas. The non-response rate for foreign doctoral recipients with temporary visas on postdoctoral status was about 9 percent.

Note

[1] Supplemental tables containing the data used in this discussion are available by request.

[2] Todd Davis, Institute of International Education. (1994). *Open Doors 1993–94: Report on International Educational Exchange*. New York.

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U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1996*. (This report has information regarding degrees earned by foreign students by gender).

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